WHAT IS CLAIMED IS:

1. A method of fabricating an electro-absorption modulator-integrated laser (EML) for optical communication, comprising the steps of:

preparing a compound semiconductor structure having a laser diode section and a modulator section growing simultaneously;

forming a two step InP layer, a bottom layer consisting of a P-InP layer and a top layer consisting of an undoped InP layer, on the top surface of the compound semiconductor structure;

forming an InGaAs layer which selectively covers the top surface of the undoped InP layer;

forming a mask layer in strips which selectively covers the top surface of the InGaAs layer, defining a trench region between the laser diode section and the modulator section;

depositing Zn or a Zn compound on the top surface of the laser diode section and the modulator section except for the trench region and diffusing the Zn; and,

selectively etching the mask layer and the InGaAs layer to a predetermined depth.

2. The method of claim 1, wherein the mask layer is formed by one of SiO_2 and SiNx to prevent Zn diffusion.

3. The method of claim 1, wherein Zn diffusion is performed in a Zn diffusion facilitating temperature range.

4. The method of claim 2, wherein Zn diffusion is performed in a Zn diffusion facilitating temperature range.

5. The method of claim 1, wherein the Zn compound is one of ZnO, Zn_3As_2, and Zn_3P_2.

6. The method of claim 1, further comprising the step of forming a metal layer on the top of the laser diode section and the modulator section after the etching step.

7. The method of claim 1, further comprising the step of removing the mask layer after the diffusion step.

8. A method for fabricating an electro-absorption modulator-integrated laser (EML) for optical communication, comprising the steps of:

simultaneously forming a laser diode section and a modulator section which selectively cover a planar surface of a semiconductor substrate;

forming an InP layer composed of a bottom layer consisting of a p-InP layer and a top layer consisting of a undoped InP layer on said planar surface;

forming an InGaAs layer covering the top surface of said undoped InP layer;

forming a mask layer in strips, between said laser diode section and said modulator

section, on the top surface of said InGaAs layer;

forming a Zn compound layer on the top surface of said undoped InP layer not covering said mask layer;

removing said mask layer after diffusing the Zn compound layer; and,

etching said InGaAs layer covered by said mask layer to a predetermined depth.

9. The method of claim 8, wherein said mask layer is formed by one of SiO_2 and SiNx to prevent Zn diffusion.

10. The method of claim 8, wherein Zn diffusion is performed in a Zn diffusion facilitating temperature range.

11. The method of claim 8, wherein said Zn compound is one of ZnO, Zn_3As_2, and Zn_3P_2.

12. The method of claim 8, further comprising the step of forming a metal layer on the top surface of said laser diode section and said modulator section after the etching step.